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ABSTRACT

A study was conducted to identify factors affecting student performance on the Texas Academic Skills Program (TASP), a state-mandated measure designed to assess students' basic skills and competencies. TASP and Assessment of Student Skills for Entry Transfer (ASSET) scores were analyzed for 328 academic track students from 6 community colleges in Texas, while students' age; ethnicity; number of remedial classes taken; college type (i.e., urban, suburban, and rural); and sex were also included as TASP predictor variables in a multiple regression analysis. The analysis suggested that students' ASSET scores were the best predictors of scores on all three sections of the TASP, while age and ethnicity were also good predictors. The strongest relationship was found between scores on the reading section of the ASSET and TASP tests, while the weakest was found between the mathematics sections of the tests. The effects of age and ethnicity, however, were most pronounced on the mathematics section of the TASP. The analysis also suggested that neither the number of remedial classes taken by students, the type of college students attended, nor student gender were significantly related to outcomes on the TASP. (HAA)

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The Texas Study

A Regression Analysis of Selected Factors that Influence the Scores of Students' on the TASP Test

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Paper presented at the Annual Conference of the Texas Association of College Testing Personnel (Houston, TX, October 17, 1996)

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Running Head: The Texas Study

ABSTRACT

ASSET and TASP test scores for 328 students from six community colleges which are located in the Southeast, Northcentral, and Southern parts of Texas were analyzed. A multiple regression model used ASSET scores, age, ethnicity, number of remedial classes taken, college type, and sex as predictor variables for TASP scores. The six colleges were divided into three groups (urban, suburban, and rural) and the regression tested which factors influenced the TASP scores the most among those groups. The results of the study indicated that ASSET scores carried the heaviest beta weight in this model, with ethnicity and college type also being important. Moreover, ASSET scores were found to correlate with TASP scores when other selected factors were partialed out. The number of remedial classes students take had little effect on their TASP scores, while ethnicity did. Finally, ASSET and TASP scores were correlates in every comparison, but no significant difference was found between the coefficients when compared by college type.

The Texas Study: A Regression Analysis of Selected Factors that Influence the Scores of Students' on the TASP Test

Many factors influence students' scores on standardized tests. Because tests such as the Texas Academic Skills Program (TASP), are state mandated to assess the basic skills and competencies of many students, it is extremely important to ascertain what factors are likely to affect performance on that assessment. To enhance students' chances of success in community colleges, it is necessary to assess their level of preparedness in the beginning of their college experience. Roueche and Archer (1979) echoed this when they opined that unless students' readiness is determined when entering community colleges, those colleges can not continue to preport to be open door institutions. Because the TASP test is directly related to students' academic advancement in Texas colleges and universities, it is important for the academic community to understand how some factors, alone and through interaction, can enhance or impede students' performance. The states of Georgia and Florida also have state mandated tests. Georgia's version is called the Regents Test and Florida's is called the College - Level Academic Skills Test (CLAST). Traditionally, some of the factors that have been closely associated with influencing the performance of students' on standardized tests have been

age, sex, and ethnicity. Further, in a study recently conducted by the American College Testing Service (ACT, 1995) in Texas, it was found that students scores on the ASSET college placement test, used by many community colleges, were correlated to their TASP scores. Moreover, Joan Gamble (1994) also found similar results in her study, which compared ASSET scores with students' GPA. The study done in Texas by ACT was a simple regression study. Based on the model some predictions of students' TASP scores were able to be made based on knowledge of their ASSET scores. This information was very helpful, but at the same time raised several questions for the community colleges that used this test for placement purposes. Primarily, those questions involved two general areas. First, would the number of needed remedial classes taken by students , based on ASSET results, have a positive affect on their TASP performance, thereby providing another factor that could be used to predict TASP performance and for individual advisement ? Secondly is the relationship in question consistent within different types of schools and between different types of schools? No existing research has addressed these questions in a community college setting.

Such information would allow researchers to create a pool of factors that would provide practitioners in community colleges with information that could be very helpful in the advisement of our students. Moreover, this information could be added to the small body of knowledge that we now have related to Texas community colleges. Other than technical information provided by state agencies, such as the TASP technical summary (1995), very little data exist that can be directly inferred to community and junior colleges, in particular data that is collected by community college personnel and analyzed

by them. This is important for many reasons. One significant reason is that many polices and procedures for community colleges are established based on information put together by individuals , agencies, and institutions that have little knowledge of the characteristics of community and junior colleges and little or no stake in the resulting consequences of those policies and procedures.

The purpose of the "Texas Study" is to investigate the relationship of the selected predictor variables to the three sections of the TASP test. This regression model should provide information about the amount of influence the factors individually and interactively have on TASP performance. In addition, the researcher sought to ascertain if the relationship between TASP and ASSET revealed in a similar study held "true" when other factors were partialed out, and if those relationships are consistent across different types of community/Junior colleges. Moreover, the results of this study should provide usable information for counselors, advisors, and instructional personnel pertaining to student performance, problems in assessment between colleges, and differences among subgroups.

Method

Subjects

ASSET and TASP scores from 328 academic track students were randomly selected from six community colleges located in the southeast, southern, and northcentral parts of Texas. The test scores were three years old or less. The colleges were divided into three groups (urban, suburban, and rural) based on how they are identified in the current *College Handbook*. This directory is published by the college board which is a non-profit

association of colleges, education associations, schools, agencies, and systems which serves secondary and higher education. The sample included Whites, Blacks, Hispanics, and other ethnic groups. The students were generally freshmen and sophomores who ranged in age from 17 to 55 years (M = 23.44).

Measures

Scores from the ASSET and TASP tests were used in this study. The ASSET test is the assessment instrument of choice used by many colleges across the state of Texas. This test was originated by the Los Angeles Community College and the American College Testing Service (ACT) and is written by (ACT). The ASSET is a program that provides placement information and other data to user schools. The test reliability was established by computing the KR-20 reliability coefficients, and consist of six sections. The reliability for form B is .87 for writing, .78 for reading, and .86 for numerical skills. They are the same for form C, except the numerical skills is .86. There are two forms of the test (form B and C) available, and the six sections include: writing skills (36 items), reading skills (24 items), numerical skills (32 items) , elementary algebra, intermediate algebra, and college algebra. For this study only the numerical skills scores were used for math score computations.

The Texas Academic Skills Program (TASP) is also a complete program that was established in 1989. The test is a state-required test for students in Texas who had not received at lease (3) semester college credits prior to September, 1989 or did not make adequate scores on some other acceptable standardized test. The test has three sections,

which are: reading (36 items), writing (35 items), and math (48 items). Students must pass all three parts before exceeding (60) semester hours. Like ASSET, the TASP uses the Kuder-Richardson (KR-20) internal consistency method to establish reliability of that test. The coefficients are reported in ranges as follows: reading .75-.85, math .86-.90, and writing .86-.89. The test was written by the National Evaluation System (NES) in conjunction with the Higher Education Coordinating Board and the Texas Education Agency. The focus of this test is to identify students who are at risk because of insufficient academic skills and to provide advisement and remediation that will enhance their skills. Other psychometric data is available in the current *TASP Technical Summary* which is published by the National Evaluation Systems, Inc. (NES).

Procedure

Three hundred and twenty eight (328) ASSET and TASP scores of community college students were randomly selected from six colleges located in the southeast, northcentral, and southern parts of Texas. These colleges were divided into three groups based on the aforementioned criteria. Other data collected included the students' sex, age, ethnicity, number of remedial classes taken, and type of college the student attended (urban, suburban, or rural). Instructions were given to participating colleges that all ASSET scores and remedial classes completed by students must precede the TASP scores. The researcher reviewed all data to verify that those instructions were followed. The objectives of the Texas study generated four basic research questions:

1). To what degree do the selected variables or factors influence TASP scores ?

2). Is there a significant relationship between TASP and ASSET scores when the other variables are held constant ?

3). Does ethnicity significantly influence TASP performance among the three types of colleges?

4). Is there a significant difference in the magnitude of the relationship between ASSET and TASP scores between types of colleges ?

To address research question (1) a stepwise multiple regression model was formulated using college type, number of classes taken, sex , ethnicity, age, and ASSET scores as predictor variables and the scores on the three sections of TASP as the criterion variables. Moreover, to ascertain the strength of the relationship between TASP and ASSET while the other selected variables (age, classes taken, sex, college type, and ethnicity) are held constant a partial correlation procedure was done. These variables were partialed out for all three parts of the TASP (reading, writing, and math) and displayed in a table separately. To see what influence ethnicity has on TASP performance among the three types of colleges, ethnicity was entered into the regression model for the three types of colleges, and the four types of ethnicity were also analyzed using the one-way ANOVA. Finally, product moment correlations were computed on ASSET and TASP scores for the three types of colleges separately, then those coefficients were transformed to (Zr) scores and tested at the (5%) level to determine if the difference observed between them was significantly different from zero.

In addition to the procedures above, the researcher examined mean scores of subgroups based on age, ethnicity, and sex using the single factor analysis of variance (ANOVA), and correlation matrices were formed to identify relationships of interest. In other cases where differences between two means were compared, T-tests for independent samples were used. All statistical analysis were tested at the (.05) level or better. Although these extended analyses were not required to address the four research questions, they were reported as additional research information for this study.

Results

An analysis of the six predictor variables on the three sections of TASP revealed that the ASSET scores were the best predictors in every comparison. Age and ethnicity were also good predictors in the model. The number of remedial classes students took, type of college (urban, suburban, or rural) they attended, and students sex added very little to the regression model. The strongest prediction model was found with the reading model, $\underline{R}$= .58. The writing section was the second best prediction model, $\underline{R}$= .50, and the weakest coefficient was found in the TASP math model, $\underline{R}$= .45. The coefficient of determination (R^2) is given in each comparison to show the degree of increase gained by adding another factor. The coefficient of determination (R^2) highlights the amount of change in the TASP score that is attributed to a unit change in the predictor variables. These results are displayed in Table I.

TABLE I

Regression Sumary Table For TASP – READING

Influence Variable	Coefficient (r)	Beta	Multiple (R)	R^2	R^2 Increment
Asset R	0 56	0 53	0 571	32 6	
Age	0 02	0 04	0 576	33.1	0 5
Ethn	-0 22	0 07	0 578	33 4	0 3
Num Reading Classes	-0 26	0 04	0 579	33 5	0.1
Type College	0 09	0 01	0 579	33 5	0
Sex	0	0	0 58	33 6	0 1

R= 58
R Adj = 568
R^2= .336

Regression Sumary Table For TASP – WRITING

Influence Variable	Coefficient (r)	Beta	Multiple (R)	R^2	R^2 Increment
Asset W	0 33	0 38	0 47	22	
Age	0 05	0 06	0 48	23	1
Ethn	-0 2	-0 09	0 5	25	2
Num Reading Classes	-0 24	-0 1	0 5	25	0
Type College	0 14	0 1	0 5	25	0
Sex	0 04	0 01	0 5	25	0

R=.50
R Adj=.49
R^2=.25

Regression Sumary Table for TASP – MATH

Influence Variable	Coefficient (r)	Beta	Multiple (R)	R^2	R^2 Increment
Asset M	0 29	0 25	0 29	8	
Age	-0 15	-0 08	0 37	13 7	5 7
Ethn	00	-0 03	0 42	17 6	3 9
Num Reading Classes	-0 29	-0 27	0 44	19 3	1 7
Type College	0 08	0 19	0 44	19 3	0
Sex	-0 16	0 13	0 45	20 2	0 9

R=.45
R Adj =.43
R^2= 20

Notice that the ASSET score in each comparison is the single most consistent predictor of TASP scores in this model. This is expected as each section of ASSET correlates with its associated part of the TASP at the (.01) level. moreover, number of classes taken, sex, and college type add the least amount of increase to the (R^2) increment. These last three variables do not increase prediction ability to any degree when attempting to predict TASP scores. Also, it was found that the six predictor variables had the strongest influence in the math model. The increment values were greater in this comparison than in the reading and writing comparisons.

When the partial-correlation procedure between TASP and ASSET scores was carried out, it was revealed that the relationship still "held" after the effects of the other six variables were "partialed" out. The strongest relationship before and after partialing was between the reading scores (.58 vs. .49) and the weakest was between the math scores (.29 vs.27). Further, the correlation analysis indicated that ASSET and TASP scores are related in all of the three college groups. These findings were similar to those revealed in Gamble's study (1994) at Terra state community college, as well as with those in the (ACT) study (1995) conducted in Texas. Further analysis with the (Z) transformation procedure revealed that the magnitude between the coefficients of the three types of colleges was not significantly different from zero. None of the resulting (Z) scores exceeded (1.96), which is the critical value for the (.05) level established for this study.

Comparisons of mean scores of the four ethnic groups (White, Black, Hispanic, and Other) were compared by college type. Each college type was broken down by (4)

ethnic groups then each group mean score for the three parts of TASP were compared by the one-way ANOVA. This generated nine comparisons, and every analysis revealed a significant difference between ethnicities with only one exception, the math section for suburban colleges.

In addition, suburban colleges had the highest mean scores for all three parts of the TASP when compared to rural and urban colleges in the research sample and had the least amount of variation of scores. When the mean scores of the three types of colleges were compared for the three sections of the TASP test, the ANOVA summary indicated that there is a significant difference between the performance of the different types of colleges on the reading section of TASP, $F(2,320) = 5.70, p < .0037$. It further revealed similar results on the math section as well, $F(2,323) = 3.31, p < .037$. And the writing section analysis also revealed the same finding, $F(2,319) = 4.40, p < .013$. Moreover, the performance on TASP in the research sample generally followed the Texas state pattern of Whites scoring highest on all sections, Hispanics second highest, and Blacks scoring lowest. In comparison, this is consistent with the results for the (CLAST) test reported in the Florida technical report for 1994 - 95. However, the data revealed that in rural colleges, Hispanics' scores exceeded those of whites on all sections of TASP, and Blacks out performed Whites on the reading section based on mean scores for the three groups in the research sample. The computed ANOVA results verified these findings, [Reading, $F (3,51) = 3.23, p < .029$, Math, $F(3,54) = 9.52, p < .0001$, and Writing, $F(3,50) = 2.88, p < .044$]. Every result was significant at better than the (.05) level.

When the correlation matrix was formulated to ascertain if the number of remedial classes students take were correlated to their associated TASP scores, no significant positive correlations were found. In further analyses, t-test for independent samples were computed using a random sample of 70 students who needed remediation. That sample was broken down into two groups: those who took remediation and those who did not take the remedial course work. Students who did not take remedial work (X = 227.4) had scores slightly higher than those who took the classes (X= 198.2) on the math section of TASP, and the results were found to be significant, $t(68) = -3.32$, $p < .0016$. The same applied to the students who took the reading section of TASP, $t(68) = -2.93$, $p < .0045$. There was no significant difference found between the two groups as it relates to the writing section when compared, $t(68) = .836$, $p > .412$. Though supprizing, these findings are not unique. Gabe (1989) at Broward community college in Florida, discovered in his study that students who needed and took remedial classes in mathmatics and english did no better than those students who needed but did not take remedial classes. In fact, he reported that those who did not take the needed remedial classes in english did preportionally better than those who took remedial classes.

Discussion

The findings that the ASSET scores were the best overall predictors for TASP scores in the regression model are consistent with the findings of a similar study conducted by ACT in 1995. That study used a simple model (Y = A + B X) comparing score to score and making predictions based on the results. That the factors age and ethnicity were the

only other factors that added any noticeable increase to the prediction power of the regression model indicates that these factors are some what significant in predicting what a students score will be; they do have an effect. However, college type, sex, and more importantly the number of remedial courses taken are not very helpful in this quest.

The small values of the multiple regression coefficients indicate that other factors or variables could affect TASP scores that were not included in this model. The largest coefficient (.58) for the reading section for instance, only accounts for approximately 34% of any variation in the TASP scores. This leaves another 66% of variation in the TASP score unaccounted for. It would take a coefficient of (.71) are greater to account for 50% of the variation in TASP scores. The other two coefficients account for even less of the variation in the TASP scores. This is also evident when these predictor variables are partialed out of the ASSET/TASP correlation analysis.

It would be interesting to see if a larger sample from urban colleges would still result in their performing more favorably on all sections of the TASP. These results could be used as a basis for additional studies which would focus on type of college and performance patterns. It would also be interesting to see if a larger sample of rural scores would result in Hispanics outperforming Whites on the test and for Blacks making higher reading scores. The implications to community colleges in this area are very great. This is of interest because the state pattern is (White, Hispanic, and Black) in that order on all portions of the test, although available data indicates that Blacks have been the most improved group of the three ethnic groups.

Nothing revealed in this study indicates the number of remedial courses students take will enhance their performance on TASP. This is one of the most significant findings of the study. This situation was consistent across colleges. Rural, urban, and suburban colleges all are subject to these results. The results are also consistent with an earlier pilot study conducted by the researcher during the months of March and April of this year. The data in this study does not offer an answer for this situation, nor was it the focus of this study. Further investigation will be necessary to provide some perspective as to the reasons for these findings.

This study has several practical implications. When attempting to predict the scores of students on TASP, one of the best predictors is their corresponding score on the ASSET. Their age and ethnicity are factors to a lesser degree. In as much as the lowest Scores on the TASP are on the math section for all students, and the effects of age and ethnicity are more pronounced on that section than on the other two, it is advisable to consider these facts when advising students about taking the test. The math section of this test appears to give the most trouble to students, but they take more math classes than they do reading and writing. To advise students how to prepare for TASP is difficult at best in view of these results.

Remedial courses do not seem to be affective based on the results of this study. Additionally, findings in similar studies suggest the problem may be widespread. The underlying reasons for this should be the focus of other studies. Much research, investigation, and development is needed in the advising and instructional components of the community college setting.

As TASP appears to be a major obstacle for all students at Texas community colleges in general and for minority students in particular, much work lies ahead. According to the American Association of Community College's "Trends in Statistics" (1995), 44% of all undergraduates attend community colleges and 47% of minorities enrolled in higher education attend community colleges, which is nearly half the undergraduate student population. In addition, the five most popular fields in which students are awarded degrees (liberal/general studies, business management, health professions, engineering-related technologies, and protective services) require skills and concept knowledge that are relative to those required to past TASP.

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